

Royal Botanic Gardens
and National Herbarium

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Danthonia



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NEWSLETTER OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

Palm Conservation in the Palmetum, Townsville

John Dowe, Parks Service, Townsville City Council

The plant collection maintained in Townsville's three botanic gardens - The Palmetum, Anderson Park Botanic Gardens and Queen's Gardens - holds a reasonably large number of endangered/rare species, some of which are important conservation subjects. Tucker(1989,1990 & 1992) wrote of the conservation of endangered palms in The Palmetum, Townsville's newest and most ambitious botanic gardens project. He emphasised the necessity of maintaining as large as possible gene pool and how best to avoid problems associated with hybridisation in the botanic gardens context by intelligent design and plant placement.

The focus of Townsville's botanic gardens' collection since the 1980s, has been the palm family. The Palmetum, a botanic gardens of 25 hectares, represents an important contribution to the international network of botanical gardens because of its unique specialisation. The palm collection stands at ca 300 species in the ground and an additional ca 350 species in the potted collection. To further enhance the focus on palms, publication of *Mooreana*, Journal of the Palmetum, was commenced in 1991,(now in its

third volume), whilst phase one of The Palmetum Interpretive Centre has recently opened. The Interpretive Centre, in Tumbetin Lodge, a renovated Queenlander style tropical timber building which was architecturally renovated and relocated to a prime site near the main entrance to the Palmetum, has displays featuring the ethnobotany, evolution, anatomy and morphology of palms.

As a direct result of this focus on the palm family, a number of study projects have been undertaken within the botanic gardens. Three projects involving endangered/rare palms have been completed, whilst a fourth is near completion. Those completed include:

- 1) Study of the taxonomic history and relationships of the endangered Northern Territory palm *Ptychosperma bleeseri* Burret (Dowe 1993a).

- 2) Study of the floral behaviour and fruit development of *Wodyetia bifurcata* Irvine, the Foxtail Palm (see Dowe 1993b).

- 3) Successful submission of a proposal to include an additional four palm species (bringing the total to six) on the schedule of the Nature Conservation Act

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Editorial

The range of articles that appear in this edition of *Danthonia* continue to reveal the wealth of activities that are being carried out in Australia in plant conservation. They range from the off site work being done with palms in Townsville to protecting *Acacia latzsii* in the wild in the Northern Territory. The letters to the editor indicate the good response that the ANPC and *Danthonia* is receiving both from members and others. Members are again invited (in fact, encouraged) to use this section not only for responses to articles or other ANPC issues but also to present short summaries of any particular work that they are doing.

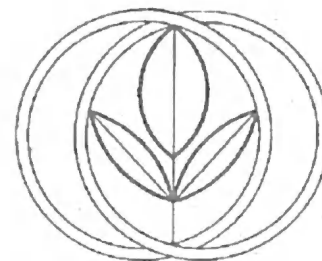
In our last edition we introduced the new section - *Viewpoint*. It is hoped that members who have particular views on any matter relating to plant conservation will use this section. While we don't see it as a forum for personal disputes, an occasional bit of self flagellation won't be rejected!

At the establishment of the Australian Network for Plant Conservation, it was agreed that the most important factor determining its success would be communication and co-operation between members. Over the past year and a half, there have been a number of instances that have indicated that this is happening. However, it is still not happening to the extent that is needed. In our second Newsletter, a request was made by Norfolk Island for information of any plantings of *Hibiscus insularis* in Australia. Since that request was made there has been no

response. It is likely that this lack of communication is common in other organisations similar to our own and may partly be due to the way in which the request was presented in *Danthonia*. Your comments on overcoming the ANPC's communication shortcomings are invited.

Over the past few months the interest in the ANPC has continued. We have received subscriptions from many new individuals and groups who are interested in the ANPC's work as well as the coming conference. If there are others that you think should be involved let them know about what we are doing or let us know their address so we can contact them.

As always any articles concerning the work that you or your organisation is doing are welcome.



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(Qld) 1992

The project yet to be completed is a contribution of conservation recommendations for Australian and south-west Pacific palms for the IUCN/Species Survival Commission's Global Action Plan for Palm Conservation (see Johnson 1991).

Of the three completed projects, that involving the Nature Conservation Act will potentially have the greatest impact on palm conservation in Australia, as the species listed will soon be subjects of protective legislation.

Prior to the acceptance of the additional species to the list, only two other palm species were being considered, being, *Livistona drudei* F. Muell. ex W. Watson (3VC rating), the Northern Weeping Cabbage Palm which is restricted to near coastal areas between Townsville and Kurrimine Beach, and which has become severely threatened through habitat degradation and loss. The other being *Calamus warburgii* Schumann (2VC rating), a rare rattan which is restricted to the Iron Range area of Cape York Peninsula (though it has an extra-Australian distribution in Papua New Guinea).

The four additional species on the list include:

1) *Arenga australasica* (H. Wendl. & Drude) S.T. Blake; which is distributed disjunctly along the coast and nearby islands from Hinchinbrook Island to Cape York in Queensland and the Top End of the Northern Territory. It is threatened due to degradation and loss of habitat. (3VC rating)

2) *Gulubia costata* Becc.; (3VC rating) which occurs in small populations, on eastern

and northern Cape York Peninsula in Qld (extra-Aust. distribution throughout coastal PNG), where it is severely threatened by predation of fruit, seedlings and juvenile plants by feral pigs.

3) *Livistona lacuginosa* A.N. Rodd in edit; which occurs on creek banks in the upper Burdekin River system, an area marked for major agricultural development. The species is not conserved in any National Park or declared reserve and is under threat due to habitat loss and degradation. (2V rating)

4) *Normanbya normanbyi* (W. Hill); which is confined to the swampy lowlands between Mossman and Cooktown, where it is severely threatened by predation of fruit, seedlings and juvenile plants by feral pigs and the decline in the Cassowary population, the primary natural distributor of the species. (2VC rating)

All six species destined for inclusion on the Nature Conservation Act list are being grown successfully in The Palmetum and the Anderson Park Botanic Gardens. All have reached reproductive maturity and offer an accessible resource for study and/or propagation material.

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VIEWPOINT

A Toast to Taxonomists

Judy Barker

Reprinted from SGAP Victoria
Newsletter, March 1993

The Editor has asked me how my fellow members of the Australian Daisy Study Group and I are getting on with the spate of name changes occurring within the family Asteraceae. It is true that there are many generic and specific changes and new species names to cram into our overburdened memories, but far from needing a Bex and a nice recumbent position, we are finding the new groupings fascinating.

There seems to be no doubt that botanists everywhere agree that the genera *Helichrysum* Miller and *Helipterum* DC in the strict sense do not occur in Australia. The Australian species hitherto included in them must be placed in other genera.

As the new classifications and revisions are published we are seeing sweet reason appear - from the growers point of view as well as from the taxonomist's.

In the past we have been worried about the almost random characters displayed by species in the two genera mentioned. Why did some species need light to germinate, why did a solution of gibberellic acid promote germination in some species and not in others, and why did the optimum temperature for germination vary so widely?

Recent work by Willis and

members, Dr Kerry Sharman and Lotto von Richter, are providing results that foreshadow the emergence of a picture that is logical rather than haphazard.

The former *Helichrysum apiculatum* and *H. ambiguum* have been found to require light for germination. In the revision both are included in the new genus *Chrysocephalum*. Perhaps it will be found that all the species in that genus behave in the same way and we will be able to suggest that no blue metal or gravel mulch be used to cover the seeds in the case of this genus.

Similarly, it was reported that gibberellic acid (500ppm) promoted germination of *Helipterum albicans* and *H. molle* and lo, they are now in the one genus, *Leucochrysum*. It may well be that *L. fitzgibbonii* (formerly *Helipterum fitzgibbonii*) will respond in like manner. It is not too keen to germinate if left to its own devices.

Previously we have swallowed the fact that the colourful annuals *Helichrysum filifolium* and *H. subulifolium* (20cm and 30cm respectively) were included in one genus with such shrubs as *Helichrysum cuneifolium* and *H. diosmifolium*, both at least 2m high. How much more suitable it is to find the first two now included in *Schoenia* with other annuals. It is also very agreeable to find all the shrubby helichrysums now congregated under the old generic name *Ozothamnus*.

The genus *Argentipallium* now includes such perennials as *Helichrysun blandowskianum* and *H. obtusifolium*....; both of which grow in nutrient poor soils and are much more

attractive in the wild. Seeds germinate poorly at first, but freely in the second year if they are just left outside. It will be interesting to see if the other species in *Argentipallium* behave in similar fashion.

A very minor cause for distress has been the change of *Helipterum roseum* to *Rhodanthe chlorocephala* subsp. *rosea*. There is no quarrel with the reason for the alteration, only with the length of the new name. Even this minor quibble is unimportant. Our customers usually come up to the seed bank asking for "that pretty pink and white flower that you said was easy to grow".

The Australian Daisy Study Group has much appreciated the generosity of taxonomists in our field who have given us previews of their decisions. They do not seek to tax our brains, but to bring order out of some degree of chaos. Many of us find it exhilarating; some just like growing daisies and don't much care what they are called.

Ref: Temperature and Light
Effects on the Germination of
Seven Native Forbs, Willis, A J
and Groves, R H (1991) *Aust. J.
Botany* 39: 219-228.

Grasslands Conservation

I read with interest John Arnott's review of the conference *The Great Plains Crash*, which focused on the conservation of the Victorian grasslands and grassy woodlands. I had the privilege of opening the conference and, as John pointed out, took the opportunity to review grasslands conservation at the international and national level. This was a deliberate choice on my part, to underscore the fact that the parlous state of grassland conservation is not a Victorian issue, and I presented some statistics to highlight this fact.

In his review, John has me "reflecting on the fact that only 0.09% of Australia's grasslands are suitably protected in conservation reserves". While this is a disturbing statistic when compared to the national average of lands within the conservation estate of about 6%, unfortunately it is also overly optimistic!

In fact, the table from which John has drawn his statistics presented the status of grasslands in terms of million hectares. Thus of the 43.3 million hectares of natural grassland present in 1788, there are currently about 34.9 million hectares of grazed "natural" pasture, 3.6 million hectares of grasslands in which the indigenous flora has been largely replaced by exotic sown pasture and crop species, and 4.8 million hectares of grasslands being converted to woodland through invasion

by introduced Prickly Acacia (*Acacia nilotica*).

Rather than a percentage, the figure John quotes for conserved native grasslands represents an actual area of 0.09 million, or 90,000 hectares. In percentage terms this means the area of grasslands protected within the conservation estate in comparison to the area of grassland at the time of European settlement is therefore about 0.002%, less than 1/20th of the national average percentage of lands protected within the conservation estate.

This appalling situation is a result of the economic value grasslands have represented for agricultural and other development purposes. As is the case with much of the conservation estate, the existing reserves have generally been selected from those areas suitable for other forms of land use, or for some outstanding geographic feature. As a result, grassland reserves are usually atypical, small and fragmented, a situation which does not reflect the importance of grasslands as a part of Australia's biodiversity.

I fully concur with Jamie Kirkpatrick. Both nationally and internationally grasslands are probably at a greater risk of extinction than almost any other ecosystem.

Fortunately there is a growing community awareness of the value of all the 'less fashionable' ecosystems, and governments are responding to the pressure emerging from forums such as the *Great Plains Crash*. A major recent develop-

ment is the Government's commitment to having all major Australian ecosystems adequately represented within the reserve system by the year 2000. In announcing this new program in his Statement on the Environment, the Prime Minister identified the conservation of native grasslands and grassy woodlands as the national reserve system's first priority.

However, grasslands conservation cannot simply be an exercise in real estate acquisition. The existing small and fragmented grasslands remnants, accidentally protected in cemeteries, railway reserves, roadsides and travelling stock routes offer an exciting opportunity to test our theories on bioregional management. Because of past management history it is likely that even the best of the remaining temperate will require some degree of ecological restoration. Community involvement in research and on ground projects will be invaluable in developing and implementing effective methods of achieving the restoration, and perhaps the total reconstruction, of these ecosystems.

The Endangered Species Program and the Save The Bush Program have been actively encouraging and funding projects related to the conservation of grassland species and communities throughout Australia for a number of years. The establishment of the Grasslands Ecology Unit within the Australian Nature Conservation Agency, also an-

sonia sp. (Smooth Davidson's Plum).

The Herbarium suggests that the absence of branching and reddish new growth could be related to the vigour of the plant and the growing conditions.

As regards the vandalism of rare plants we adopted the principle of not labelling such samples as rare. We also plant them among other plants.

Since most concerned plant people who would know the identity of rare plants would not be likely to "pinch" them we considered that this scattered planting would fool the vandals.

It seems to have worked in that in the 13 years of the Park we have only had one plant taken. That was a newly planted specimen of *Syzygium hodgkinsoniae* which is attractive but certainly not rare. When our plants become very well established we will probably label them with additional information but not in the young stages. I also totally agree with Russell's comments on collection from the wild and the necessity to limit collection but not prohibit same. The exchange of propagating material between all those who are growing plants is certainly the way to go. I get a bit annoyed at the sometimes encountered attitude of "I have one and you don't" and would like to see free exchange among everyone concerned.

Our specimens of *Acronychia littoralis* were grown from cuttings of the type tree which is in a very precarious situation. Hence we have specimens that are genetically identical. We are certainly willing to share limited cuttings to those who would like

nounced in the Statement on the Environment, will further boost these efforts.

There is an urgent need to further our understanding of the ecological processes operating within and beyond the natural, the altered and the synthetic grassy ecosystems, in order to better protect and manage our threatened communities. The challenge of the Grasslands Ecology Unit will be to develop this radical new conservation effort which adequately integrates rare species and community specific protection and management with holistic landscape-scale research and on ground projects.

Dr Peter Bridgewater
Chief Executive Officer
Australian Nature Conservation Agency

More on *Davidsonia*

The article by Russell Costin in the May issue relating to *Davidsonia* sp. raises a couple of points

Russell describes the plant as a small, bushy undershrub with shiny dark red new growth. The plant which we have in Brunswick Valley Heritage Park was planted in 1986 from a root sucker obtained from a different locality to Russell's. It is now 3m. in height with only 5 short branches no more than 18cm long in the lower one. New growth is lime green with no sign of redness. The first branch is at 1m. Since the description given by Russell was so different to our plant I forwarded a sample to the National Herbarium of NSW just to make sure. Advice received confirms its identity as *David-*

sonia. They grow very easily from cuttings.

Congratulations to all those concerned who organised the ANPC.

A R Maslen
President

Byron Bay Flora and Fauna
Conservation Society.

Still more on *Davidsonia*

I was most interested in the May issue of *Danthonia*. I think your staff does a wonderful job on producing information on plant conservation in Australia. Whoever is involved with the publication should be highly congratulated.

I was particularly interested in the articles on Tasmanian plants, since we visited some of those areas when we were there, your article on botanic gardens seedlists which is certainly true, and finally the article on the smooth-leaved Davidson's Plum. I am currently growing some Davidson's Plum seeds which I received from Helen Andrews of the Society for Growing Australian Plants in Queensland. I am excited about having them as an indoor pot plant in the house. I had not realized there is a smaller species of the genus, since I thought there was only one species in the genus. I would be very interested in knowing how well it does as an ornamental, because I think, potentially, it could be saved in large part through ornamental horticulture.

Dr Roy L Taylor
Director
Chicago Botanic Garden
USA

MEMBERS ACTIVITIES

Conservation Co-operation with Department of Roads and Transport, Tasmania

Susan M. Wells,
Royal Tasmanian Botanic
Gardens

Whatever can the Botanical Gardens possibly be doing, their car parked beside the road in the middle of nowhere and a couple of people crawling about in the grass there

It is a well known fact among conservationists, that as one bowls along our country roads the weedy-looking strips between the fenceline and the side of the road often hold more interest than the average motorist might think. More frequently than they probably imagine, it could be one of the precarious last ditch stands by a rare or threatened plant species, crowded out of its original homeland by farm clearance, road and housing development, etc, and left to fend for itself in a narrow corridor of road reserve.

Jed Gillian, Environmental Planner with the Department of Roads and Transport (DRT) in Tasmania, until comparatively recently has been a lonely voice in the road planning section, calling for the preservation of the natural species of the area, and particular the rare or threatened species. Many years ahead of his time, his persistent efforts have paid off, and it is now automatic in any road construction work to

order a plant survey of the roadside flora by a competent botanist. As a result, a full botanical report is prepared, drawing attention to any unique habitat or plant that has rare or threatened status as listed in the 'Reservation and Conservation of Tasmanian Native Higher Plants' (Kirkpatrick et al 1991).

The Department then plans a re-routing of the proposed roadworks if this is in any way possible, and will purchase further reserve land for protection for a species if it is forced to go through the population because a re-routing would cause danger or a large blowout in costing.

There was a missing link in the chain however. Botanists urged the 'rescue' of rare plants that were unavoidably doomed, but the Department had no expertise or facilities for doing so. A chance conversation one day in 1992 led to the Royal Tasmanian Botanic Gardens (RTBG) being asked to rescue such plants, look after them and aim to propagate further from them, and when all the dust had settled, to return them to the roadside reserves as close as possible to their origin.

Thus it was that within five months the Gardens received four separate calls for help, and currently have a further two imminent. On these occasions, two or three members of the staff venture forth with the relevant botanical report in hand. The expeditions have taken us to various parts of the State, once involving an over-

night stay. Most have involved more than one species needing 'rescuing'. Cuttings and seeds are taken, and where feasible whole plants are collected and potted up. An awareness of the possibility of unintentionally collecting the root rotting fungus *Phytophthora cinnamomi* is important.

For each species collected, detailed field notes, photographs and herbarium specimens are taken. Rescue plans are prepared for each species, growth and propagation results are monitored. It is envisaged that most plants will remain with us for up to a year or more before being returned, and the aim will be to replant in late autumn so that the plants are well established by the following summer.

We have just returned from our first replanting exercise, (May 1993), having planted almost double the number of plants of *Eryngium ovinum* (listed as endangered and unreserved in Tasmania) rescued from a road widening operation on the east coast last September. They were planted on the roadside reserve in three groupings, one of which will be subject to occasional rough mowing (which will probably be beneficial to it), and two in light scrub which will be left unmown. The Department erect signs that are recognizable by roadgangs as indicating the presence of a rare plant. Although our contract finishes with the replanting, I suspect we will be unable to resist a bit of monitoring in the future when passing by!

Already our plant from one site, also on the east coast, has assumed an importance undreamed of when collected. Despite all the hard work and attention to detail that the DRT has projected into their conservation work, it took just one slip-up in communication for a newly acquired road reserve, purchased as a safe haven for an existing population, to go the way of the neighbouring roadside verges under the flattening power of the bulldozers in the road widening exercise. When our team happened to pass by the following day there was nothing to seen but dusty wasteland. Dejection in the Roads Department on receipt of this news was followed by a stringent tightening up of procedures and the wasteland will be monitored closely to study natural regeneration and weed control. The collection the RTBG had made from the road verges a month earlier will be used as a small nucleus for recolonizing the 'reserve'.

Our work with the DRT has had the benefit of involving several of our gardening staff, who have shown great interest and enthusiasm, and the nursery staff, who have fitted it into an already hectic schedule with very good humour and interest. The project can be used by the Education Officer, and it certainly gains respect for the Department of Roads and Transport. Moreover, it increases the knowledge of our rare and threatened plant species, and has resulted in further sightings of species from previously unrecorded areas from staff involved with the rescues. Together with our work with the Tasmanian Endangered Plants Recovery Team and the recent establishment of the

Tasmanian Section in the Gardens, the RTBG has moved well away from its lack of involvement with conservation only three years ago.

Species collected to date from projected roadworks: *Eryngium ovinum* (endangered, unreserved in Tasmania); *Viola cleistogamoides* (limited distribution in Tasmania); *Stenanthemum pimeleoides* (vulnerable, endemic to Tasmania); *Pimelea pauciflora* (limited distribution and unreserved in Tasmania); *Vittadinia gracilis*, (vulnerable in Tasmania); *Vittadinia muelleri* (limited distribution in Tasmania); *Juncus amabilis* (limited distribution and unreserved in Tasmania); *Stipa nodosa* (limited distribution in Tasmania).

Exclosure to protect *Acacia latzii*

SGAP Group - Alice Springs

A*Acacia latzii* is a rare tree (Risk Code 3V - Briggs and Leigh, 1988) known only to occur at two locations in the southern Northern Territory: on Henbury Station approximately 130km south of Alice Springs and on New Crown station near the South Australian border. It grows to about 5m in height and is of somewhat similar appearance to mulga (*A. aneura*). At Henbury, it is found on the footslopes of mesas and along associated gullies. The footslopes, in particular, have a very stony mantle overlaying (often saline) clayey soils. there is often a sharp boundary between the *A. latzii*, which is found on the lighter coloured silcrete-type soils and mulga which grows on adjacent footslopes

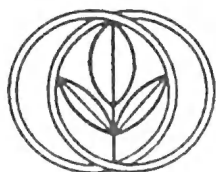
with red-earth soils.

The *A. latzii* population seems healthy at Henbury. Mature trees seed well but juvenile forms are very rare. This is thought to be due to ring-barking damage by rabbits, and possibly browsing cattle. Following initial discussions between Peter Latz (an ecologist with the Northern Territory Conservation Commission and after whom the tree is named) and members of SGAP, we undertook to protect the small areas of the Henbury population with cattle and rabbit proof exclosures.

Suitable areas were agreed upon in a joint inspection between Peter Latz and SGAP members last February. Approval was obtained from the owner of Henbury to erect two small exclosures; one being 40m square and the other 35m by 25m. The Conservation Commission very kindly provided fencing materials and SGAP members erected the exclosures over two weekends in July 1993. Both exclosures consist of steel end-assemblies, star pickets at five metre intervals, three barbed and two plain wires. One of the plain wires is located 400mm out from the fence and is used to secure the rabbit proof netting. A continuous layer of stone was then placed on the outer margin of the netting to prevent rabbits burrowing under the fence.

At the time of these working bees, and in a subsequent visit, photo points were established and the locations of all specimens of *A. latzii*, within and surrounding each exclosure, recorded. A check-list of all other plants within each exclosure was also compiled, with heavily browsed saltbush

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*Do you know of anyone who would be interested in becoming a member of the ANPC?
If so, please provide us with their name and address or you may even wish to consider a
gift membership!*

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(*Atriplex vesicaria*) anticipated as being one of the first to benefit through protection from cattle grazing.

Both exclosures are now on a long-term observation and maintenance basis by SGAP members and rangers at the Watarrka (Kings Canyon) National Park. They will be inspected periodically to check fences, measure rainfall collected by a storage rain-gauge, take photos and most interestingly, document the fate of any specimens of *A. latzii* germinating.

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Briggs J,D and Leigh J,H (1988). *Rare or Threatened Australian Plants*. ANPWS spec. Publ. 14, Canberra.

The Olive Pink Flora Reserve

Stuart Trainer, Trustee, Olive Pink Reserve

The Olive Pink Flora Reserve is unique among Australian botanic gardens. It is situated on the east bank of Alice Springs' dry Todd River. The 16 ha reserve was gazetted in 1956 after strong representations to Government officials by one of Central Australia's most colourful characters, Olive Muriel Pink (1884-1975). Miss Pink, as she was known to everyone in Alice Springs, was granted an occupational lease on part of the reserve on condition that she act as honorary curator. She lived there in a galvanised iron shed until she died in 1975 at the age of 91.

Miss Pink came to Central Australia in 1930 to help the cause of Aboriginal people. She was a pioneer in advocat-

ing for their rights to self determination and land. It is perhaps unfortunate that she is remembered more for her eccentric ways and her knack for raising the hackles of officialdom than for her undoubted vision. It was Miss Pink's intention that the reserve contain representative specimens of the desert flora of central Australia.

It was to this end that she and her Aboriginal gardener Johnny Jambijimba Yannarilyi worked. Following her death the reserve was renamed Olive Pink Flora Reserve and is managed today as a tribute to her vision and tenacity. It is currently Australia's only established arid zone botanic garden despite the fact that nearly three quarters of the continent is arid land.

The reserve has over 300 of the Centre's 800 plant species on display. Sections of the reserve are being developed to represent distinct habitats within Central Australia. These include a sand dune system, mulga woodland, a rocky waterhole and, below it a creek floodout area. These areas are enhanced by the original vegetation of the rocky hills which surround much of the reserve. A spectacular view of Alice Springs is obtained from the walking track which takes you from the air conditioned visitor information centre up to the top of one of these hills.

A number of rare plants are being grown in the reserve. Acting as a storehouse for rare and relict species is seen by the Board of Trustees as one of the most important functions of Olive Pink Flora Reserve.

However, its main role is as a vehicle for community education. The reserve aims to

increase appreciation of Australia's arid zone flora and encourage the use of indigenous vegetation in Central Australian gardens and landscape design. The reserve seeks to set an example to local people of what can be achieved by using these species rather than introducing plants that are inappropriate for the arid environment. Particular emphasis is placed on water conservation through good landscape design, the use of drip irrigation and mulching.

A visit to Olive Pink Flora Reserve is a wonderful introduction to the flora of Central Australia, even though the reserve is very much in its infancy. As with all botanic gardens, time will enhance its appearance and reputation.

Seed Collecting

Peter Hind - reprinted from the October 1992 Newsletter of the Macarthur Group of SGAP

The following notes provide information on some of the important points to be considered when collecting seeds in the field.

Information required before collecting

It is important to know for what purpose the seeds are to be used (eg. research needs). It is important to evaluate the suitability of the seeds available eg do the seeds appear healthy, mature and viable. Therefore a brief survey of the seed available is useful before a larger collection is undertaken.

Documentation

Documentation must be to the same standards as expected for all herbarium collections eg a herbarium voucher should/must be collected and lodged in an appropriate institution. The voucher must be representative of the seeds collected. The information required, beyond that normally recorded for herbarium vouchers, may include information that will assist in the cultivation of the plant.

Availability and accessibility of seeds

Some seeds are available throughout the year, eg most *Banksia* species, while others are only available over a limited season eg. *Acacia* species. Therefore knowledge of the fruiting characteristics of the species to be collected is necessary before planning a seed

collecting trip.

The accessibility of seeds is dependent on many factors including habit, habitat, particularly topography and land tenure. Naturally, tall trees and cliff dwellers present special problems for the seed collector and special collecting techniques are often required in such situations. To deal with land tenure normal procedures for plant collecting apply, ie permission is required from those responsible for the management of the land.

Maturity/Ripeness

One should always ensure that the fruits, and hence seeds are mature. The features of the mature seeds of the species concerned should be known before attempting to collect them. If not known, do what everyone else does, have a guess! For example, fruits of most *Callistemon* species need to be about four years old to obtain mature viable seeds, exceptions include *C. viminalis* where fruits release viable seeds annually.

If *Acacia* are required for immediate germination (within a few weeks), then the seeds should be collected green, but with the testa mature. This avoids the problem of the hard seed coat inhibiting germination. However, remember, these 'green' seeds are not suitable for storage.

Freedom from pests (eg. Insect damage, fungal attack)

The most suitable seed for germination is that which is free of disease or damage. Most pests encountered in-

clude insect larvae and certain beetles that eat fruits and seeds. Fungal problems (eg. mildew) may develop, particularly in wet seasons. Ergot is frequently a problem with grasses affecting viability, storage life and suitability for sending overseas. Fungal rots and mildews are more of a problem when incorrect storage occurs eg. if the plant material is kept in a plastic bag for more than a day. This is most likely to be a problem when there is a significant quantity of fresh leafy material in the bag. On long trips, spreading out the calico and paper bags of the seed collections until they are ready to dispatch. Once the seeds have been returned to the institution, the seeds or fruits should be spread out on shallow trays and placed in a drier immediately so as to reduce the possibility of mould developing. The moisture content must be reduced prior to storage for most seeds. The drying dessicates most insect larvae that may be present in the seeds. Beware of high temperatures as this may damage the seeds.

Handling, Cleaning and Dispatch of Seeds

* Dry Fruits

Normally, the seeds of dry fruits are collected and temporarily stored in calico or paper bags with fine fruits/seeds always in paper bags. These bags of seeds are kept in a dry environment prior to processing.

* Fleshy Fruits

Fleshy fruits which contain fleshy seeds are normally kept moist but must be transported

quickly to the end user before they rot. Most of the seeds lose viability rapidly if allowed to dry, while fleshy berries, e.g. Solanaceae, keep better if the seeds are extracted as soon as practicable after collection. A brief period of fermentation of the fruit is often beneficial in assisting with the removal of the flesh surrounding the seed.

Cleaning techniques

Cleaning techniques involve mostly mechanical methods, e.g. thrashing, sieving, winnowing, (mostly carried out after returning from the field). Cleaning is required for dry fruits so that the seeds can be released from the fruits and to also remove much of the bulk sterile material. The cleaning of the fleshy seeds involves fermentation, followed by dialysis (sometimes only the latter). Cleaning is required for fleshy fruits, particularly when germination inhibitors are known to be present in the flesh of the fruit. Further processing of seeds from fleshy fruits are then treated as for dry seeds.

Dispatch From Field To End User

Dispatch seeds as quickly as possible after collection and ensure that the seeds are securely packaged, kept dry, and protected from excessive temperature fluctuations eg. freezing or cooking.

CONFERENCES

ANPC Conference

By this stage you will have received the registration and information flier for the "Cultivating Conservation" conference to be held in Hobart, Tasmania in December. One small error has been noted on the form, and that is the dates are from the 5th to the 9th December, not the 5th to 10th December as advertised. Our apologies for this error.

"Conserving Biodiversity- Threats and Solutions"

This conference was held at the University of Sydney from the 29 June to 2 July 1993 at the University of Sydney. The conference was organised by the NSW National Parks & Wildlife Service. This conference was well attended by representatives from National Parks services, zoos, CSIRO, universities, landcare and community groups of various sorts, botanic gardens, water resources organisations. The Forestry & Mining industries were not well represented.

The conference consisted solely of papers, no workshop sessions were available. Whilst the papers presented were interesting, there was not a great deal of new substance presented. With the brainpower that was available in the audience, I feel that more might have been achieved by workshop sessions. Two special evening sessions were held, and there was a comprehensive poster session.

The program was broken into a number of sections:

- i) habitat loss & rehabilitation
- ii) degradation and pollution of water resources.
- iii) feral plants & animals
- iv) commercial use of native biota
- v) changes to fire & climate.
- vi) can government solve the problems.

Of these, a number have particular relevance to the ANPC though much of what was presented has had fairly wide coverage before: we already have too many policies and strategies & we have enough data to act on and people want to take action now; the issue of population needs to be taken seriously now; there needs to be more interaction with local government; scientists need to develop skills in communication and broadcast their message more widely and more often; the principles of ecologically sustainable development should be better examined and observed, most ecologists prefer to work in pristine areas and there is an urgent need for work in disturbed areas and advise on how they might be rehabilitated; that most rural land managers are sympathetic to the basic principles of managing land for the future, but have other influences governing what they are able to do.

A very strong message that came from the conference was the obvious need for a return to the system where extensions officers were employed by all major organisations. These

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Learning To Propagate An Endangered Grevillea

Christopher McCormack and Greg O'Neill. (Acknowledge Australian Horticulture).

The growth habit and flowering characteristics of *Grevillea caleyi* makes this a species with significant horticultural potential.

It is a large, spreading shrub dominant in the understorey of the dry sclerophyll forest or woodland of its native habitats. Its long arching branches are complemented by conspicuous, red, terminal toothbrush-like racemes occurring predominantly in spring.

Young foliage is characteristically pinkish-red and covered in dense, soft, whitish hairs. The texture of the deeply divided leaves with the soft hairy covering and the pink blush of new growth contribute to the portential marketability of this species.

G. caleyi is a rare and endangered species indigenous to the narrow strips of lateritic soils on the highest ridges in the north-eastern region of Sydney.

Due to the plant's limited distribution and proximity to highly urbanised development, its existence is threatened by road construction, weed invasion, rubbish dumping and careless maintenance practices.

The decline of *G. caleyi* may be further exacerbated by the long-term threat of chang-

es in genetic stock influenced by hybridisation with related *Grevillea* species in nearby gardens. The heavy seeds (the largest of all the *Grevillea* species) are poorly dispersed and tend to remain beneath parent plants in a dormant state. These factors contribute to limited seedling establishment in the existing populations.

The combination of low seed production and numerous habitat pressures that seed collection for propagation may further deplete an already seriously threatened wild seed source.

The establishment of a reliable method of propagating *G. caleyi* by cuttings would be one way to relieve the pressure on seed in the wild.

Investigation into vegetative propagation of *G. caleyi* was undertaken by research staff at Mount Annan Botanic Garden in 1990. Trials were begun in 1991 to determine the optimum plant growth regulator (PGR) concentrations required for striking semi-hardwood cuttings. The results of this study will help establish production techniques for *G. caleyi* appropriate for implementing conservation strategies and encouraging development of the species in commercial production.

PGR Treatments

The three synthetic PGRs which were used in this experiment were indole-3-butyric acid (IBA), a combined (IBA)-naphthalenacetic acid (NAA) treatment, and Clonex 3000, (3000ppm IBA plus other

constituents). Five IBA solutions were prepared from a powder using 50% ethyl alcohol as the solvent. These solutions contained 2000, 4000, 6000, 8000, and 10,000 parts per million IBA. The combined IBA + NAA solution was prepared using IBA and NAA at 1000ppm each in 50% ethyl alcohol, while Clonex 3000 was used in its commercial form. Sixty cuttings per treatment were dipped for 10 seconds in each of the respective treatments. In a control treatment, 60 cuttings received no PGR. Following treatment, (five per pot) were inserted 20-30mm deep in a medium which consisted of two parts perlite, one part peat and 0.5 parts sand. The pots were placed on a bench supplied with bottom heat, with a glasshouse with day temperatures maintained at 20-27 degrees C and light responsive misting. The cuttings then remained under these conditions for seven weeks. At this point, the cuttings were removed, measured and assessed for comparative root development.

Criteria for assessment included the presence or absence of callus or roots, the number of roots per cutting, the length of roots, the number of branched roots and the number of branched roots greater than 5mm long.

The optimum PGR treatment was determined by high performance in combination of the above criteria.

Findings

Table 1 describes the

percentage of cuttings that produced roots following application of the respective PCR treatments. Figure 1 indicates the average root length of roots per pot on cuttings with roots. This is a measure of the extent of root production on cuttings that produced roots (up to a maximum of five cuttings per pot).

Cuttings treated with IBA, particularly at 6000-10,000 ppm, exhibited an advantage over the untreated controls and the treatments of IBA+NAA and Clonex 3000. The higher concentrations of IBA noted above produced cuttings with the longest average root lengths

Conclusion

The summary of rooting percentages of *G. caleyi* cuttings shows that higher IBA concentrations promoted greater rooting percentages than the lower IBA concentrations, the combination treatments (IBA + NAA and Clonex) and the control treatment. Furthermore higher IBA concentrations were associated with longer roots on the cuttings and the greatest lateral root production occurred in the IBA 8000ppm treatment. The effects of the Clonex 3000 and IBA 2000-4000ppm were similar but none of these treatments were as successful in encouraging root development as IBA 8000ppm. The use of Clonex 8000 in the propagation of *G. caleyi* by cuttings may be a practical measure based on the findings of this report and warrants investigation.

Implications of Findings

Under the environmental conditions of this study, root

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Table 1. Rooting percentages of <i>G. caleyi</i> cuttings	
Treatment	Rooting %
Control	3
IBA 2000ppm	45
IBA 4000ppm	68
IBA 6000ppm	67
IBA 8000ppm	80
IBA 10000ppm	70
IBA + NAA (1000ppm each)	50
Clonex 3000	42

Figure 1. Average length of roots (mm) per pot on cutting with roots

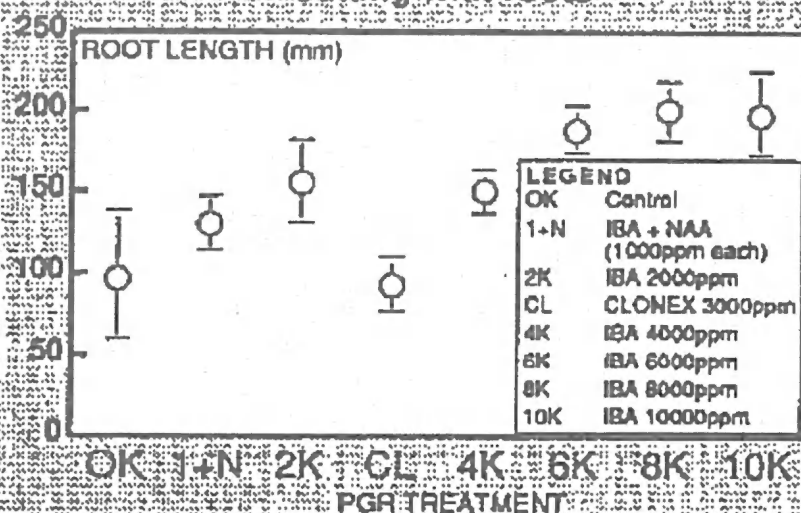
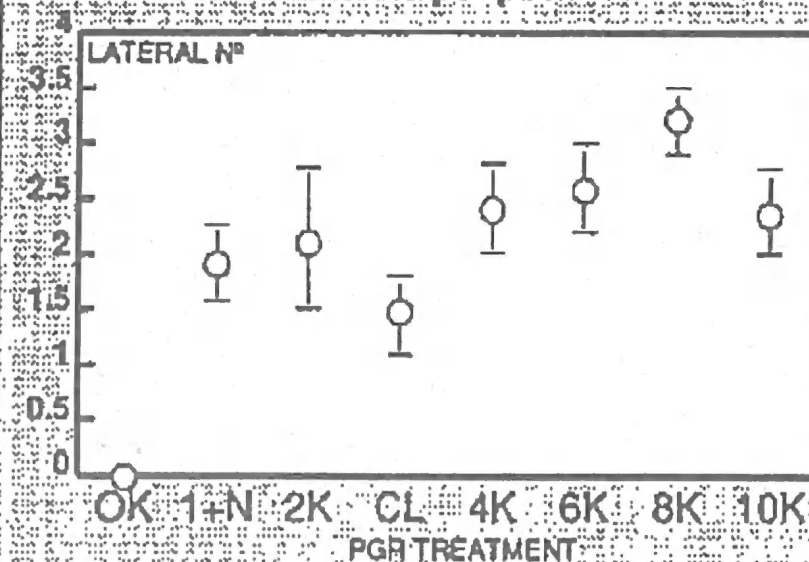


Figure 2. Number of cuttings with roots with laterals per pot



Grevillea caleyi cont'd

ing of cuttings was achieved in seven weeks. This represents a reasonable propagation period for commercial production of Australian plants by cuttings. These results should help lude the implementation of vegetation programs that include *G caleyi* grown from cuttings taken from in-situ populations.

Biodiversity Conference

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positions were critical in translating the data produced dby scientists and in relaying it to the community in a form t h a t w a s m o r e e a s i l y understood.

The population factor seems to be arising as an issue again, but action needs to be taken on this quickly. The financial values of our society were also questioned. These are two issues of primary importance.

The conference really showed that communications and training of all levels of the community is essential. One interesting result of the conference was a concerted effort to form an organisation of scientists to lobby more directly to save biodiversity. Some of their aims are to ue media more effectively, to communicate by publications to the public, providing direct advice to government, both State and Federal.

As many of the actions proposed by the conference are directly relevant to ANPC members, it would be worthwhile assessing how you may become involved in some of the issues listed above.

THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

MEMBERSHIP LIST

The date (1993) indicates that the member has joined or renewed for this year.
Addresses and names of contact persons are available from the National Office.

- Botanic Gardens of Adelaide, SA (1993)
Albury Botanic Gardens, NSW (1993)
Alcoa of Australia Ltd.; WA (1993)
APPM Forest Products; Tas (1993)
Arid Land Botanic Garden, SA (1993)
Association of Societies for Growing Australian Plants (1993)
Australian Association of Bush Regenerators (1993)
Australian Forestry Council, Tas (1993)
Australian Mining Industry Council, ACT (1993)
Australian National Botanic Gardens, ACT (1993)
Australian Nature Conservation Agency, ACT (1993)
Australian Tree Seed Centre, CSIRO, ACT
Barry, S. Qld (1993)
Boden, R. ACT (1993)
Botanic Gardens Conservation International; UK (1993)
Briggs, B. NSW (1993)
Brisbane Botanic Gardens - Mt. Coot-tha (1993)
Brown, A. ACT (1993)
Brunswick Valley Heritage Park, NSW (1993)
Buddee, D. NSW (1993)
Burke, C. Qld (1993)
Burns, D. Tas (1993)
Burrendong Arboretum Trust; NSW (1993)
Center for Plant Conservation; USA (1993)
Irene Champion, Qld (1993)
Coates, A. WA (1993)
Coffs Harbour City Council; NSW (1993)
CSIRO, Division of Plant Industry; ACT (1993)
Conservation Commission of the Northern Territory (1993)
Deakin University, Rusden Campus Library, Vic (1993)
Department of Parks Wildlife and Heritage, Tas (1993)
Donaldson, S ACT (1993)
Dulegal Arboretum; NSW (1993)
Eurobodalla Botanic Gardens, NSW (1993)
Fenton, E Vic (1993)
Ganter, W. ACT (1993)
Flecker Botanic Gardens; Qld (1994)
Friends of the North Coast Regional Bot. Garden; NSW (1993)
Friends of the Points; Vic (1993)
George, E. WA (1993)
George Caley Botanic Garden; NSW (1993)
Gilfedder, L. Tas (1993)
Gladstone Tondoon Botanic Gardens; Qld (1993)
Good, R. NSW (1993)
Gordon, D. Qld (1993)
Gorst, J. Tas (1993)
Green, S. RBG Kew, Wakehurst (1993)
Greening Australia (ACT) (1993)
Greening Australia (NSW) (1993)
Greening Australia (Vic) (1993)
Greening Australia (WA) (1993)
Hadlow, B. ACT (1993)
Hemmings, L. Vic (1993)
Hind, P. NSW (1993)
Honiara Botanic Gardens; Solomon Islands (1993)
Hunter Region Botanic Gardens; NSW (1993)
Johnston, S. ACT (1993)
Kebun Raya Indonesia (1993)
Kingfern Natives; NSW (1993)
Kings Park and Botanic Gardens; WA (1993)
Limpinwood Gardens Nursery, NSW (1993)
McDonald, W. Qld (1993)
Mason, D. NSW (1993)
Matthes, M. NSW (1993)
Mattingley, S. ACT (1993)
Meyer, J. Tas (1993)
Mitchell, G. NSW (1993)
Myall Park Botanic Garden, Qld (1993)
National Botanical Institute, South Africa (1993)
Nieboer, L. Vic (1993)
Noble, M. NSW (1993)
Norfolk Island Botanic Gardens (1993)
NSW National Parks & Wildlife Service, Queanbeyan (1993)
Olive Pink Flora Reserve; NT (1993)
Oxford, H. SA (1993)
Parsons, B. Vic (1993)
Querengasser, K. Qld (1993)
Quinn, B. Vic (1993)
Rare Plant Consortium, Canada (1993)
Rempel, S. Canada (1993)
Robinson, B. NSW (1993)
Royal Australian Institute of Parks and Recreation, (1993)
Royal Botanic Gardens, Melbourne, Vic (1993)
Royal Botanic Gardens, Sydney; NSW (1993)
Royal Tasmanian Botanical Gardens; Tas (1993)
Salkin, E. Vic (1993)
SGAP - Canberra Region Inc (1993)
SGAP - Dryandra Study Group (1993)
SGAP - Grampians Group; Vic (1993)
SGAP - Grevillea Study Group (1993)
SGAP - New South Wales Ltd. (1993)
SGAP - Newcastle; NSW (1993)
SGAP - North Coast; NSW (1993)
SGAP - North Shore; NSW (1993)
SGAP - North West; Tas (1993)
SGAP - Pine Rivers; Qld (1993)
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SGAP - Queensland Region (1993)

SGAP - South Australia Region (1993)

SGAP - South West Slopes; NSW (1993)

SGAP - Tasmania Region (1993)

Smith, M. NSW (1993)

Smith, H. NSW (1993)

Stony Range Flora Reserve, NSW (1993)

Sunraysia Oasis Botanical Garden, NSW (1993)

Suva Botanic Gardens; Fiji (1993)

Thomas, P. RBG Edinburgh (1993)

Threatened Species Network (NT), Northern Territory (1993)

Townsville Botanic Gardens; Qld (1993)

Tumut Ecology Reserve Trust; NSW (1993)

Turner, R ACT (1993)

Vailima Botanic Gardens; Western Samoa (1993)

VCAH Library, Burnley (1993)

Wallace, D. Vic (1993)

Wannan, B. NSW (1993)

Wildflower Society of Western Australia (1993)

Wildflower Society of WA - Mandurah Branch (1993)

Wilkinson, T. NSW (1993)

Willinck, J&A NSW (1993)

Woodruff, B ACT (1993)

Wrigley, J NSW (1993)

WorldWide Fund for Nature Australia (1993)

Zoological Board of Victoria (1993)

THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

Just over 200 hundred years of European settlement has had a severe impact on Australia's natural ecosystems. The current estimate of extinct plant species in Australia is more than 70, with more than 175 species endangered and another 3200 under some degree of threat.

Fortunately, the community is becoming more conscious of the need to protect global environments from the threats facing them. It is universally recognised that the preservation of habitat is the most desirable means of conserving the biological diversity of all organisms. However, some of these organisms are so threatened that the only means of saving them will be to secure them outside of their natural habitat until suitable places can be located to establish them. Some may have to be maintained permanently in ex situ collections. This complementary role for ex situ conservation is now being referred to as integrated conservation.

In March 1991 the Australian National Botanic Gardens (ANBG), with support from the Federal Endangered Species Program, held a conference entitled "Protective Custody". The aim of the Conference was to involve organisations and individuals interested in plant conservation and to encourage co-operation between these organisations by the formation of a co-ordinating body for plant conservation. Delegates from Britain, Fiji, New Zealand, Indonesia, the Solomon Islands, the United States of America and Western Samoa also attended the Conference.

During the Conference, consensus was reached that the Australian region does need a body to co-ordinate integrated plant conservation. A proposal for the formation of the Australian Network for Plant Conservation (ANPC) was later produced and widely accepted.

The ANPC draws its membership from throughout Australia (in both public and private sectors) and has a national office at the Australian National Botanic Gardens. It will be the co-ordinating organisation for integrated plant conservation in Australia. It will:

- i) establish a multi-site National Endangered Species Collection for use in the practical recovery of endangered species as well as for research, education, display and general horticulture.
- ii) locate and bring together information on integrated plant conservation activities in Australia and provide access to this information for members.
- iii) assist in the national co-ordination of plant conservation projects to avoid duplication of effort.
- iv) provide advice to members and promote plant conservation activities.
- v) communicate on a regular basis by means of a Newsletter.
- vi) organise workshops, training courses and conferences.

For further information on the ANPC please contact the Curator, Australian National Botanic Gardens, P.O. Box 1777, Canberra ACT 2601.